

Gunnison Valley Climate Action Report

1. Introduction

In the fall of 2019 the One Valley Leadership Council (OVLC) created a sub-group made up of representatives from each local government to explore the addition of climate action and environmental sustainability as an additional focus area of the collaborative One Valley Prosperity Project.

The sub-group concluded that collaborative action among local governments, utilities, and other stakeholders in the valley would be the most effective way to reduce greenhouse gas (GHG) emissions caused by activities in the valley. As a first step to aligning action a model was developed to forecast the effect of various actions. The model was developed as an expansion from the 2015 GHG baseline report that the County commissioned from Dr. Abel Chavez. The forecast model was then incorporated into a conference which was held on January 17th. The conference was attended by the majority of local elected leaders, professional staff, and concerned members of the public. During the conference the baseline emissions from the county were presented and the current trends were forecasted. From that baseline and business-as-usual forecast we then formed focus groups for each of the main sectors driving emissions in the valley: buildings, electric utilities, transportation, and waste. Each group discussed possible actions that could be taken to lower emissions from that sector and, using data provided to them as a guide, estimated a percentage reduction possible for each sector. The remainder of this document will present the recommendations from the conference as well as further interpretation and recommendations from the OVLC climate committee.

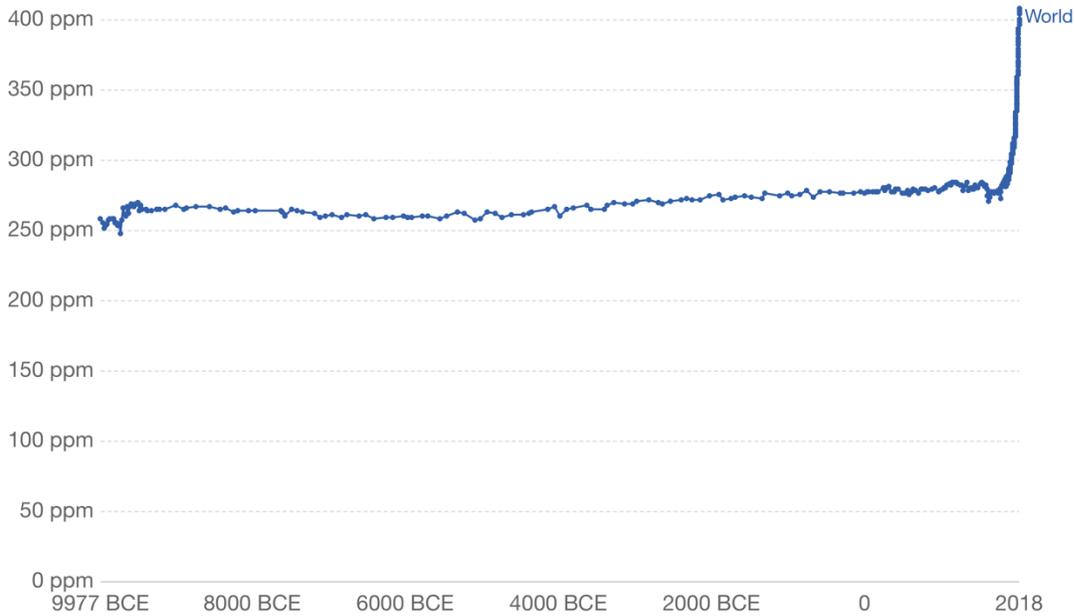
According to the International Panel on Climate Change (IPCC) report from 2018, global emissions must be reduced by 45% from 2010 baseline. In order to reach the IPCC goals some emissions will have to exceed 45% reduction because other's will not reach the goal. Goals vary among the various governments in the valley from zero emissions goals to 20% reduction by 2030. The goal of the conference and the exercise in forecasting scenarios was to understand what is possible for a county-wide reduction goal and the actions and role each jurisdiction and stakeholder group will need to take in order to accomplish a goal collaboratively.

All of the measures, forecasts, goals, and strategies and recommendations contained in this document are derived from a 2015 baseline and 2030 target year. Measures will have to continue beyond 2030 in order to track with the IPCC recommendations however, the next 10-year period up to 2030 will require a most intense effort to begin to shift our economy, development patterns, and systems to a much less carbon intensive and ultimately carbon neutral future. When the One Valley Prosperity Project was launched one of the main themes was "What kind of community do we want to be?" The next 10 years of climate action will require us to think about future outcomes we want for our community that relate to our energy use and emissions impacts for instance; housing and building types and quality, development patterns and commuting needs, economic activities, and waste. What we do relating to each of these sectors will answer through our actions the question posed by Dr. John Housdoerffer of Western State University: "What kind of ancestors do we want to be?"

Atmospheric CO₂ concentration



Global average long-term atmospheric concentration of carbon dioxide (CO₂), measured in parts per million (ppm). Long-term trends in CO₂ concentrations can be measured at high-resolution using preserved air samples from ice cores.



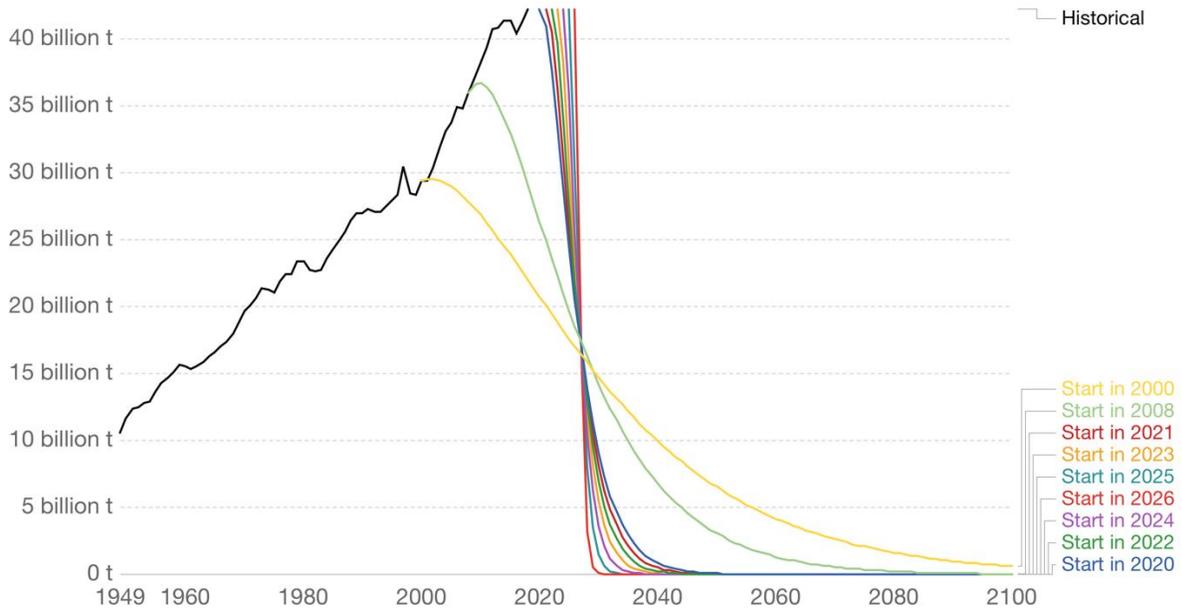
Source: EPICA Dome C CO₂ record (2015) & NOAA (2018)

OurWorldInData.org/co2-and-other-greenhouse-gas-emissions • CC BY

CO₂ reductions needed to keep global temperature rise below 1.5°C



Annual emissions of carbon dioxide under various mitigation scenarios to keep global average temperature rise below 1.5°C. Scenarios are based on the CO₂ reductions necessary if mitigation had started – with global emissions peaking and quickly reducing – in the given year.



Source: Robbie Andrews (2019); based on Global Carbon Project & IPCC SR15

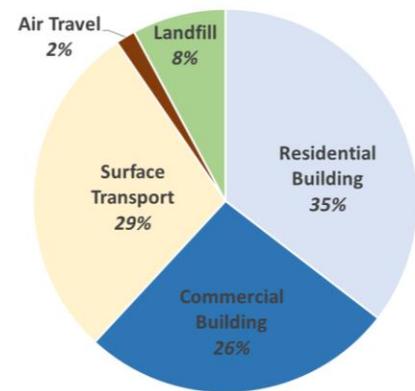
Note: Carbon budgets are based on a >66% chance of staying below 1.5°C from the IPCC's SR15 Report.

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**Gunnison County 2015 In-Boundary
GHG Emissions: 273,165 mt CO₂e**

2. Greenhouse gas baseline

Gunnison is using a 2015 baseline of GHG emissions to measure progress against. In 2015 in-boundary emissions from Gunnison county were 273,165 metric tons CO₂ equivalent (CO₂e). Buildings account for 61% of total emissions, surface transportation (vehicles) accounted for 29%, and waste accounted for 8%. Within the building sector electric generation is the largest contributor to emissions accounting for 42% of the total in-boundary emissions in the valley. Air travel is only a small part of the emissions footprint in the valley at this time and so has not been considered for mitigation efforts at this time.



Forecasting to 2030 emissions are expected to decrease by 6% under current policies adopted at the State and local level. Prior to recent local and state policy changes, and at the time of the 2015 baseline report, emissions in the county were forecast to increase by 12% by 2030.

Three main changes have contributed to the current forecasted 6% decrease:

- Adoption of the International Energy Conservation Code (IECC) by each local jurisdiction
- Adoption of California low emissions vehicle (LEV) standards by the State
- Early retirement of fossil fuel generation by electric utilities with load replaced by renewables

Each local jurisdiction in the county adopted the 2012 IECC in 2016. Buildings built to the 2012 IECC standards will use approximately 1/3 of the energy used by the average residential building in the county. By 2030, 17% of homes in the county will have been built after the adoption of IECC codes.

In 2018 the State of Colorado adopted California's low emission vehicle (LEV) standards. The affect of the standards have been modeled by Energy Information Administration (EIA). The forecasted fuel efficiencies for each vehicle type were updated in the baseline forecasting model resulting in a forecasted 28% decrease in emissions from the surface transportation sector despite an expected 17% population increase over the same period of time.

The original 2015 baseline and 2030 forecast assumed a 10% decrease in emissions from the generation of electricity sold by Gunnison County Electric Association (GCEA). Emissions have in fact decreased faster than forecasted having already achieved the reduction expected by 2030 in 2019. Further reductions in electricity related emissions have been publically announced by GCEA's wholesale power provider, Tri-State, and will be discussed and forecasted in detail later in this report. The other electric utility in the valley, City of Gunnison Electric, has also set goals to greatly increase it's proportion of renewable power generation as well.

The results of these three changes have finally turned the trajectory of emissions from the valley from always increasing to decreasing. Further, more drastic, changes are needed though in order

to significantly reduce the emissions footprint of the valley. Opportunities for deep emissions reductions will be discussed in more detail, by sector, forthcoming in this report.

3. Buildings

3.1. Sector Impacts (sector contribution to overall emissions)

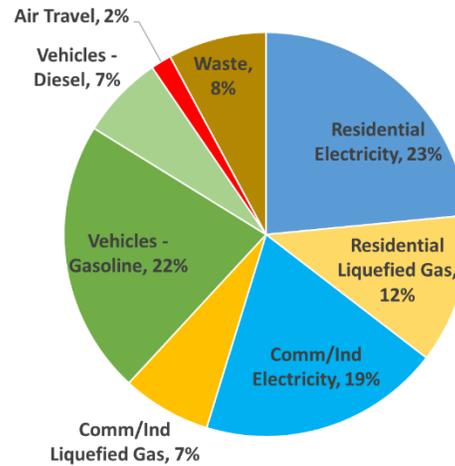
Buildings represent 61% of all emissions from activities in the county. 42% of all emissions are from electricity generation which, at this time, is almost all consumed by buildings. Therefore, reduction in emissions from electricity generation will reduce emissions from buildings. Likewise, reduction in electric emissions factors offer an opportunity to leverage low-emission electricity to further lower emissions from buildings through electrification of buildings and reduced use of natural gas and propane.

Buildings are the most effectively influenced sector of GHG emissions because local jurisdictions have authority to regulate building codes and development patterns. However, existing buildings represent a challenge. Once a building is built residents have little financial incentive to invest in energy efficiency because of current low energy costs and high property values which seem to be unaffected by relative efficiency of a building compared to others. Furthermore, the rental market currently has little to no incentive to invest in efficiency with a vacancy rate of nearly zero and continually increasing demand for rentals conspiring to limit consumer's ability to consider energy costs as a decision point when considering a lease.

3.2. Energy efficiency

Buildings in Gunnison County are less efficient than buildings in the same climate zone (7). Total energy use in buildings was calculated from utility provided data and included in the 2015 baseline report and separated into residential and commercial sectors. Total energy was then divided by total square footage of buildings in each

Gunnison County 2015 In-Boundary GHG Emissions = 273,165 mt CO₂e



Residential Buildings

Gunnison Average Residential EUI = 51
Climate Zone 7 Average EUI = 42 (EIA 2012)
2012 Energy Code EUI = 35



Ryan Residence EUI = 4

By 2030 17% of all homes in Gunnison County will have been built to 2012 Energy Code or better

sector resulting in an Energy Use Intensity (EUI) which is a globally accepted standard for comparing buildings. EUI calculated as thousands of Btu's per square foot of building area per year (kBtu/sq.ft.). In Gunnison the average residential EUI is 51, the average residential EUI in climate zone 7 is 42 according to the EIA.¹ Based on data from the 2015 GHG baseline

¹ U.S. Energy Information Administration, Residential Energy Consumption Survey 2015 table CE1.1

report and current energy prices the average homeowner in Gunnison pays \$3,296/ yr for energy. The annual energy cost of an average home that meets the 2012 IECC code (energy code) would be \$2,262. Over a 30yr life and accounting for 1% annual energy cost inflation the energy code home would save the residents \$34,785. Commercial buildings in Gunnison average EUI is 140, the average of commercial buildings in climate zone 7 in 2012 was 86².

3.3. Feedback from conference

Increasing efficiency of new and existing buildings was a major topic of discussion among participants and the conference which included commercial property owners/ managers and builders. The group targeted a 15% reduction in residential EUI and an 11% reduction in commercial EUI. Strategies considered included:

- Expansion of the GV-HEAT program to include more incentivization for all income levels
- Smart thermostat replacement program through incentives and bulk purchases through the utilities

For new buildings strategies identified included:

- Adoption of most recent energy codes
- Net-zero ready building code and potential incentivization to going beyond energy code
- Home energy rating for all homes (EUI rating or Home Energy Score)
- Incentivizing passive house principals (solar access, efficiency, walkability, natural materials)
- Low mass sunrooms
- Tax/fee for buildings over a specific size
- Elimination of minimum size requirements in sub-division covenants

3.4. Forecast based on conference goal

Modeling the goal of 15% decrease in residential energy and 11% commercial energy results in a forecasted reduction in building related GHG's of 22,510 metric tons CO₂e per year compared to business as usual. This equates to a total GHG reduction of 13%.

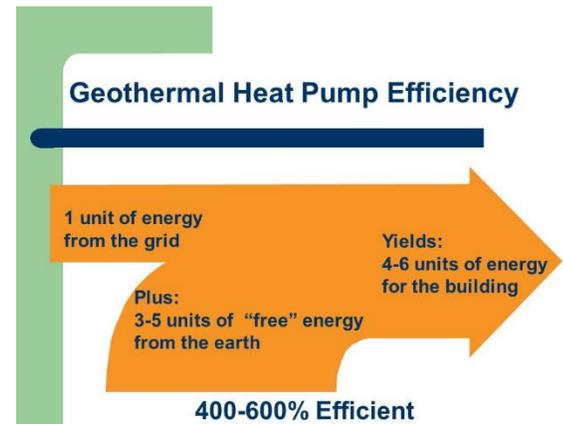
3.5. Recommendations

The goals set by participants at the conference are conservative; a 15% reduction in average EUI would still leave the average home in the county at about the average EUI for comparable homes in the same climate zone, the commercial goal similarly would result in Gunnison buildings that use more than average energy for commercial buildings. Greater energy efficiency gains are possible and needed in order to meet climate goals and reduce energy cost burden on Gunnison residents and businesses. Energy costs are historically low presently, especially for natural gas, the best way to hedge against the impact of future energy cost increases is to use less energy. Reductions in energy use intensity of 20% for residential buildings and 25% for commercial are possible but may require more aggressive tactics.

² U.S. Energy Information Administration, Commercial Buildings Energy Consumption Survey 2012 table C10

As the grid becomes cleaner; electric heating will become a lower carbon option for homes than natural gas.

- Electric heat pumps represent an opportunity to gain significant efficiency in buildings.
 - Ground source (geothermal) heat pumps are proven and achieve efficiencies of over 400%
 - Air source heat pumps are now available that will operate in our environment at 100-250% depending on outside temperatures.
- Air sealing and insulating new and existing homes is a big opportunity which starts with a simple audit of the home that includes a blower door test.
- Energy Scoring and disclosure for market transparency.



Retrofitting existing homes is challenging so incentives either through subsidies for equipment, insulation, and air sealing are necessary. Market competition based on efficiency may be encouraged by simple disclosure of energy and efficiency metrics so those metrics will be easily compared and considered when purchasing or leasing.

3.6. Forecast based on recommendations

If goals of 20% reduction in EUI for residential and 25% for commercial buildings were met it would result in a total GHG reduction of 52,157 metric tons CO₂e and a total GHG reduction of 19%.

3.7. Policy recommendations

Policies recommended to achieve recommended goals are:

- Maintain adoption of IECC code at most current standard available (low hanging fruit)
- Subsidize building energy audits or make them free (could be priority to partner to increase capacity of GV-heat?)
- Incentivize air sealing through education for do-it-yourselfers and rebates (could be wrapped into building capacity for GV-heat?)
- Develop energy reporting standard for both residential and commercial buildings (high priority)
 - Commercial reporting to central website on annual basis
 - Residential home scoring or EUI disclosure at time of sale or lease. Make requirement for listing a standardized score or EUI prominently on MLS listing.
- Incentivize heat pump retrofit and other costlier improvements like windows and insulation through low-interest on bill financing. (medium priority—until prices improve?)
- License builders and require annual training hours which include building science and efficiency.
- Award builders publicly with annual awards for lowest energy new construction and most energy reduced through renovation. (low hanging fruit?)

4. Building Electrification

Building electrification is a huge opportunity as the electric grid becomes cleaner. Currently using electric resistance heating vs. natural gas in an average furnace or boiler emits more GHG's. However, two variables offer opportunity for electric heat to result in far less emissions. The first opportunity is the cleaning up of the electric grid which will be considered more in the electric utilities section 6 of this document. As the grid cleans up even inefficient resistance electric heat will become cleaner than using natural gas. The second opportunity is heat pump technology that increases the efficiency of electric heat dramatically and offers greenhouse gas benefit even with current electricity generation emissions. The emergence of heat pumps and growing availability of more options for both geothermal heat pumps and air source heat pumps which can operate in Gunnison county's cold climate. Geothermal heat pumps are the most efficient mechanical system available but they have a high upfront cost and are not a good fit for every building. Air source heat pumps are also very efficient with the ability to produce between 2 and 4 times as much heating and cooling energy as the equivalent electrical energy input to them.

4.1. Policy Recommendations

Transitioning buildings to use electricity only for heating represents a big change from current practices that will require focused energy from policy makers and will take a long time. Policies to ban natural gas use are not encouraged at this time due to the limited and still emerging options for efficient electric heating. Incentivizing electrification as discussed in the previous section 3.7 and allowing contractors and homeowners to establish successful projects and best practices will create conditions for possible future action. Current building codes applied to modest size homes is already creating a market incentive against paying for natural gas taps on new construction because of the very small heating loads required. Conversely, a mandated ban on natural gas use resulting in poor projects or unintended consequences could set back nascent efforts to establish effective, efficient, and reliable electrification options in the near future.

5. Vehicle Travel

5.1. Sector Impacts

Vehicle travel accounts for 29% of county-wide GHG emissions. Emissions from the transportation sector continue to increase as actual fuel efficiency of vehicles is relatively stagnant because of the increasing popularity of SUV's and trucks and the increase in miles driven. These two factors influence emissions from vehicles:

- Fuel efficiency/ tailpipe emissions
- Miles traveled

The State of Colorado adopted the California Low Emissions Vehicle (LEV)³ standard in 2018 which will have an effect on fuel efficiency and tailpipe emissions. The State has also adopted the Zero Emissions Vehicle (ZEV)⁴ standard in 2019. The combination of the LEV and ZEV standards will lower emissions from vehicles by regulating vehicle efficiency and setting minimum sales quotas for ZEV's. The effect of

³ Code of Colorado Regulations; 5 CCR 1001-24

(<https://drive.google.com/file/d/1LmJQHfKUKzg6HuAKDZ0xzDO4MJMchxxA/view>)

⁴ Code of Colorado Regulations; 5 CCR 1001-24

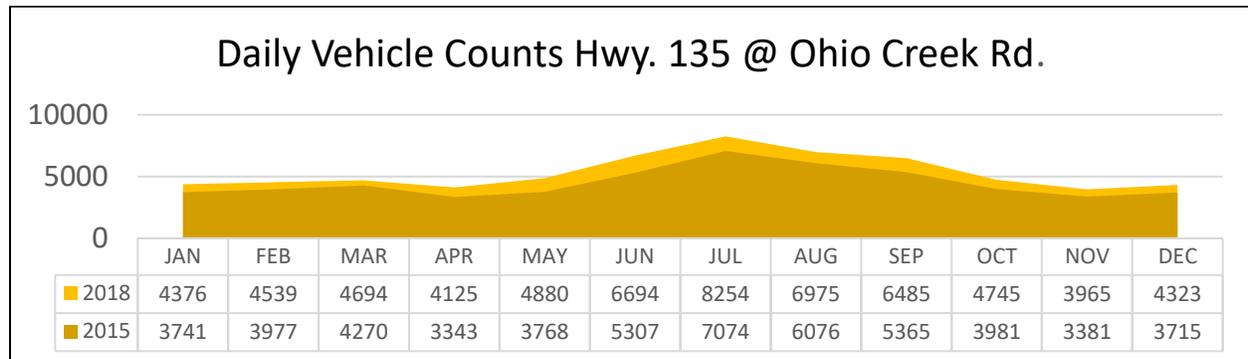
(<https://drive.google.com/file/d/1LmJQHfKUKzg6HuAKDZ0xzDO4MJMchxxA/view>)

the State regulations has been modeled in the County’s forecasting tool using data obtained from EIA forecast based on CAFÉ standards and projected vehicle sales.⁵ The results estimate a 28% reduction in GHG’s from the transportation sector by 2030.

Miles traveled in the County is the other variable accounting for vehicle emissions. For the purposes of the County’s GHG baseline report an estimated vehicle miles per person per day (VMT) has been established. Total annual road miles in the county we estimated from Colorado Department of Transportation (CDOT) database⁶. The total miles were divided by population for an average VMT per capita of 26 miles per day in 2015.

The VMT trend between 2015 and 2018 is increasing traffic and increasing VMT per person:

- Average annual vehicle counts on Hwy 135 and Hwy 50 are up 18%.
- Increases of up to 30% in summer months.
- 10% increase at lowest traffic in shoulder seasons.



Growth in VMT from 2015-18’ = 18% Population growth from 2015-18’= 4%

This data indicates that the trend of increasing VMT is likely connected to both tourism traffic but local commuter traffic as well. During the same 3-year time period county population grew by about 4%. Vehicle travel is growing faster than population. This trend aligns with long-standing national trends of increasing VMT, as a point of reference the national average VMT in 1980 was 18.5 in 2018 it was 27. The RTA bus is very successful with 224,718 one-way passenger trips logged in 2019. That works out to displacing an average of 387 cars per day or about 10% of the commuter vehicle traffic.⁷

5.2. Feedback from conference

Participants in the conference set a goal of reducing VMT by 8% by 2030 which would result in a VMT of 24. An 8% reduction is roughly equivalent to every driver not driving for 2 days they would otherwise drive each month of the year. They identified several strategies to accomplish this goal:

- Increase number of bus trips

⁵ Energy Information Administration (EIA); Annual Energy Outlook 2019, Table: Transportation (<https://www.eia.gov/outlooks/aeo/data/browser/#/?id=7-AEO2019®ion=0-0&cases=ref2019&start=2017&end=2030&f=A&linechart=ref2019-d111618a.5-7-AEO2019&sid=&sourcekey=0>)

⁶ CDOT Traffic Data Explorer: <https://dtdapps.coloradodot.info/otis/TrafficData#ui/0/1/0/criteria//51/true/true/>

⁷ The lowest avg. daily vehicle count occurs in March, 2019= 3965 vehicles per day on Hwy 135 (CDOT Traffic Data Explorer)

- Increase ridership on buses by accommodating mountain bikes and skis
- Provide ample parking for buses with park and ride locations at both ends of the Valley
- Increase Bustang service to Denver (more trips)
- Add Bustang service between Crested Butte and Montrose
- Increase school bus ridership
- Ridesharing pool sponsored by RTA and businesses
- Lower speed limits in Gunnison and improve bike lanes and non-motorized routes in the City
- Ensure workforce housing is near jobs which is attainable with wages paid

5.2.1. Forecast based on conference goal

Reducing VMT by 8% by 2030 combined with the State LEV and ZEV standards will result in a reduction of 36% in the transport sector. The reduction in the total county-wide GHG's would be about 7%.

5.3. Policy Recommendations

Local policy makers have 3 main tools to affect VMT:

- Increase mass transit availability
 - RTA buses per day summer and winter
 - Gunnison circulator bus
 - Increased ridesharing
- Inconvenience driving
 - Paid parking
 - Slow speed limits
 - Increased multi-modal space on streets
- Decrease necessary driving
 - Workforce housing near jobs
 - Reduce sprawl
 - Increase density and mixed uses in planning and zoning
 - Planning and transit/bike access to trailheads
- Encourage human powered transportation
 - Safe bike lanes
 - Improve sidewalk connectivity
 - Commercial development site planning accommodate for bikes and pedestrians

Transportation: RTA bus service

RTA Impact (2019)

- 224,718 one way passenger trips
- 141,332 one way car trips displaced/yr
- Avg. 387 cars per day



5.4. Low Carbon Transportation

Reducing miles vehicles are driven will reduce GHG emissions from transportation. Converting necessary transportation to low carbon sources will further reduce emissions. Federal and State vehicle emissions and efficiency rules are the most impactful policies upon fleet-wide vehicle emissions. The State of Colorado has moved to adopt the California Low Emission Vehicle Standard and the Zero Emission Vehicle Standards; however, the federal government has challenged California's waiver effectively invalidating the standards. Further, the federal Corporate Average Fuel Efficiency (CAFÉ) standards are being replaced by less stringent Safer and Fuel-Efficient Vehicles (SAFE) rule. In light of the uncertainty the GHG forecasting model has integrated and assumed adoption of the middle ground CAFÉ standards. These standards regulate an incremental increase in corporate (nationwide average per brand) fuel

efficiency each year. Electric vehicle incentives are baked into both the CAFÉ and California standards. Local governments can further support quick transition to more fuel-efficient average vehicle fleets.

5.5. Policy Recommendations

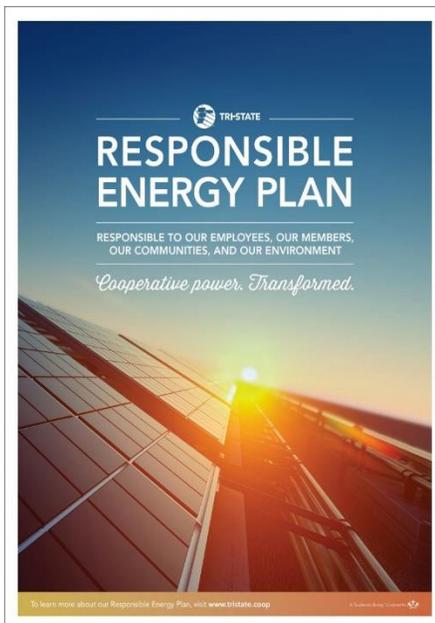
- Install or support the installation of electric vehicle charging stations
- Convert fleets to alternative fuel sources (use data to inform decisions)
- Work with utilities to ensure electrical infrastructure is prepared for electric vehicle charging loads

6. Energy/ Utilities

6.1. Sector Impacts

42% of greenhouse gas emissions in the county are from electricity generation, 19% of the total county footprint comes from natural gas and propane. Nearly all utility energy is consumed in buildings with a small amount of electric power being used for ski operations and other commercial processes and operations. Building efficiency will reduce consumption of electricity and gas but the biggest opportunity to reduce emissions from the Energy/Utilities sector is by changing electric generation.

The electric sector in the Gunnison valley is served by GCEA and the City of Gunnison. Each receive power from wholesale power providers under long-term contracts that require all power purchased by the utility to come from the wholesale power provider with carve outs for small amounts of self-generated energy or power purchases from local renewable projects.



GCEA's wholesale power provider is Tri-State generation. In 2015 Tri-State's emission factor which is a measure of GHG emissions per kWh of power produced was 0.735 kgCO_{2e}/kWh. The City of Gunnison's wholesale power provider is Municipal Energy Agency of Nebraska (MEAN). The City also receives an allocation of hydro energy from the Western Area Power Administration (WAPA) which accounts for about 30% of the City's power supply. The resulting emissions factor of the City of Gunnison utilities from combined power from MEAN and WAPA in 2015 was 0.510 kgCO_{2e}/kWh.

6.2. Opportunities and barriers; what has been done by other utilities

6.2.1 Utility Scale Renewables

In late 2019 Tri-State announced its intention to reduce its emission in line with the State's goals. Tri-State also became regulated by the Public Utilities Commission which has the power to enforce emissions reductions mandated by the State. Tri-State's "Responsible Energy Plan" promises a 70% reduction in CO_{2e} emissions by 2030 from the 2005 baseline. This major change in Tri-State's future strategy includes closing all of its Colorado coal generation resources and building more than 1 gigawatt of additional utility scale renewable resources.⁸

In the fall of 2019 the City of Gunnison announced plans to negotiate a power supply contract with their wholesale power provider to provide the City with wind energy to replace the portion of their power supply that is derived from fossil fuels and compliment the large portion of hydro energy the utility already receives.

The changes in electric utility emissions factors will dramatically lower GHG emissions from the Gunnison Valley resulting in a reduction in emissions of over 30%. However, they also present an opportunity to go even further through beneficial electrification of the building and transportation sectors. As discussed in section 4; building electrification and the use of both ground source (geothermal) and air source heat pumps will reduce energy used by buildings and when that electrical energy comes from low carbon sources the cumulative effect is even greater GHG reductions. Similarly, cleaner electricity offers will make electric vehicles more impactful in reducing emissions. It a tacit trade; as utilities invest in renewables and the grid becomes cleaner there is more incentive to promote the use of electricity in place of fossil fuels for both buildings and transportation.

Locally both the City of Gunnison and GCEA have opportunities to build utility scale renewable projects up to a limit based on a percentage of their total use. GCEA is actively working to develop hydro power at the Taylor Dam and is also working to develop grid scale solar installations. The City of Gunnison is collaborating with the County to develop a grid scale solar array at the airport.

6.2.2 Distributed Renewables

Distributed renewables, owned or leased by the customer rather than the utility is another way to integrate renewables into the grid. Both electric utilities offer net-metering options for distributed renewables. The percentage of consumers who have taken advantage of the net-metering policies is small but as the cost of solar panels continues to fall and if finance rates continue to stay low, more consumers may invest in their own solar arrays.

6.3. Feedback from conference

Tri-State's announcement of their plan to close coal generation plants and invest in renewables at a large scale dominated the discussion at the conference, along with the City of Gunnison's public discussion of a wind power purchase. The prospect of both utilities reducing their emissions factor's by large margins was welcome news and set an optimistic tone for the discussion of utilities and the ability to reduce emissions across sectors. The goals set for utility emissions reduction were in-line with the announcement from Tri-State for GCEA. For the City a reduction of 80% from 2015 levels was assumed

⁸ <https://www.tristategt.org/sites/tristategt/files/PDF/Responsible-Energy-Plan/Tri-State-Responsible-Energy-Plan.pdf>

based upon the City's goal of 100% wind power to supplement their hydro power. The City's electric emissions were not assumed to be zero because of an acknowledgement that the utility will still rely on some fossil fuel generation during times that wind and hydro cannot meet demand. The 80% reduction from 2015 still represents a very low electric emissions factor.

Other feedback includes:

- Build local solar arrays
- Develop geothermal generation at Waunita
- Include renewables in long-term land use planning
- Create pathway for renewable project review in LUR
- Continue to support the State's goals and the PUC regulatory authority

6.3.1. Forecast based on conference goal

Wholesale electric utilities achieving the emissions reductions discussed above will result in emissions factors of:

- GCEA: 0.227 kgCO_{2e}/kWh
- City of Gunnison: 0.157 kgCO_{2e}/kWh

These lower emissions factors are forecast to reduce emissions from the Gunnison Valley by 30% by 2030 including forecasted growth and with no other action

6.4. Recommendations

- Support local renewable projects by creating processes for review in land-use planning, renewable projects often cover large areas but have much different impacts than large commercial or residential development.
- Continue to monitor PUC proceedings and advocate for aggressive planning and enforcement of the transition to low-carbon electricity generation.
- Utilize publicly owned parcels (where appropriate) for grid scale renewable projects or community solar (subscription) projects
- Encourage on-site renewables like rooftop PV by creating an easy review process and removing barriers like architectural controls.
- Develop Renewable Energy Mitigation Program similar to Aspen with proceeds benefitting low-income households, potentially through GVHEAT

7. Waste

7.1. Sector Impacts

Waste represents around 8% of total emissions from the valley. Emissions related to waste mostly come from the decomposition of organic waste and the generation of methane with that decomposition occurs anaerobically which is generally the case in landfills.

7.2. Opportunities and barriers; what has been done in other communities

A couple of opportunities exist to mitigate waste related emissions:

- Reduce organic waste being landfilled by diverting it to composting or digestion facility (digestion would result in methane used to displace natural gas)
- Eliminate methane escaping into by flaring it on-site as it is generated at the landfill (generates CO₂)

Diversion of organic waste from the landfill is being done in several major cities and similar counties to Gunnison like Pitkin and Summit County, Utah. Diversion projects can produce feedstock for compost facilities or anaerobic digesters that generate renewable natural gas. Both will have ancillary emissions impacts including; transportation and material handling to combustion of methane in the case of anaerobic digestion. Challenges include:

- Land to operate large compost operation
- Logistics of further segmenting waste streams that already separate recycling from other waste
- Animal proof curbside containers
- Contamination and mixing of trash or recyclables with organics
- Sustainable business model

Opportunities include:

- Building upon experience the City has with Gunni Gold
- Teach and encourage backyard composting

7.3. Feedback from conference

The goal set at the conference was diversion of 50% of compostable organics from the landfill by 2030.

7.3.1. Forecast based on conference goal

Diverting 50% organic waste will not reduce waste related emissions by 50% because of added material handling and hauling as well as CO₂ and Methane emissions that will occur in the process. We used a model created by the EPA called WARM⁹ to estimate emissions impacts. The result of diverting 50% organic waste from the landfill is a 26% decrease in waste related emissions or a drop from 8% of total emissions to approximately 6%.

7.3.2. Action items identified

1. Find space or spaces for composting
2. Develop operations programming – publicly managed pick up/drop off systems, private business opportunity, and/or community partnerships
3. Must be available and equitable for all community members
4. Animal proof containers
5. Develop education and outreach programming
 - a. Contamination issues
 - b. What is compostable/recyclable
 - c. How to compost/recycle
6. Plan and develop a community-scale composting operation
7. Backyard composting education/classes.
8. Develop/learn from Gunni Gold, WCU, others

⁹ <https://www.epa.gov/warm>

9. Educate and promote minimum waste lifestyle and circular economy opportunities
10. Maximize composting end product –Maximize sequestration opportunities
11. Grow and utilize community partnerships (Mountain Roots--alternative orgs to provide services)

7.4. Recommendations

Set goal of diverting 100% of organic waste from the landfill by 2030. Work with local waste businesses to develop both local composting and/ or haul organic waste to commercial scale compost facility in Montrose County. Hauling waste to another county is not ideal but may be necessary to develop the market and create consumer habits that are necessary to develop a local compost facility that is sustainable. Feasibility studies and GHG forecasting of options needs to be completed to inform policy.

7.5. Forecast based on recommendations

Diverting 100% of organic waste from the landfill by 2030 would reduce emissions from the waste sector by 73%.

8. Discussion/ Summary

8.1. Connection/ links to other priorities

8.1.1. Sustainable Tourism

Tourism is a main driver of the economy in the Gunnison Valley. The Sustainable Tourism and Outdoor Recreation Committee (STOR) is working to address tourism-based impacts upon local landscapes through collaborative action of land management agencies, local government, and other stakeholders. The STOR group has not at this time addressed the impact tourism has upon GHG emissions. Opportunities exist to educate and encourage tourists and local recreationalists to lower their GHG footprint. Including developing a trailhead planning process that considers rideability and transit opportunities from population centers to reduce vehicle traffic at trailheads and VMT associated with activities.

8.1.2. Affordable Housing

Affordable housing is a crisis for the Gunnison Valley. There is not enough housing available at price points that can be attained by workers in the median and low-income ranges. Additionally, the condition of much of the existing housing stock that is affordable is poor and uses more energy to heat than the average home. Improving the efficiency of existing housing stock will reduce the cost burden to heat homes and make them more affordable. Creating housing that is near jobs that can support the housing costs will reduce traffic and the associated emissions. Creative use of deed restrictions, housing efficiency standards, and land use processes including maintenance codes may offer opportunities to incent and fast track workforce housing and redevelopment of existing, blighted housing.

8.1.3. Land Use

Land use planning can both reduce additional emissions through tactics like limiting sprawl. Also, promoting land management strategies that will lead to more carbon sequestration in soils can be achieved through supporting research and education efforts and by maintaining open spaces and working ranches. Land agencies like BLM and Forest Service may also have opportunities to maximize carbon sequestration through land management strategies. Carbon sequestration in landscapes is an intentional, active process that will require people to achieve. It will support ranchers, foresters, and others who manage lands and may bring added value and revenue to struggling industries.

8.1.4. Economic Development

Local economic development and maintenance of existing economic engines is dependent upon the Gunnison Valley's landscapes and climate. Climate change poses a risk to our current uses and future growth because it increases the occurrence of unpredictable and unseasonal weather and precipitation. Greater variability and the likelihood of a dryer and hotter average climate threatens the stability of the ski industry, increases fire risk, and makes our forests more fragile and less resilient to recovering from human impacts. Though we cannot affect global climate change by the actions of this valley alone, we have a moral obligation and a financial obligation to the next generations to do what we can to reduce GHG emissions that lead to global anthropogenic climate change.

8.2. Organizational Alignment:

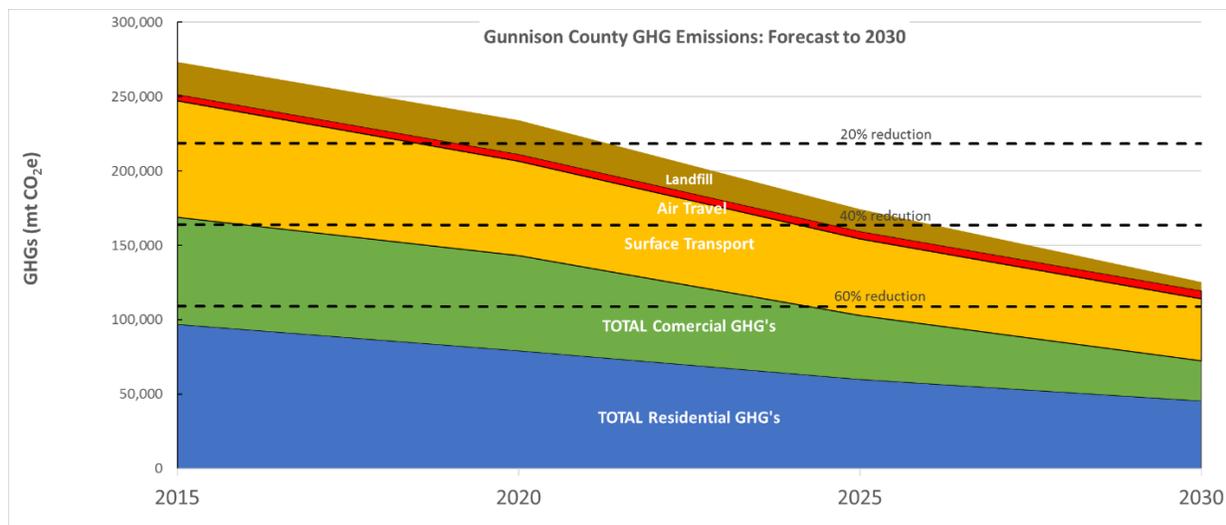
Each of the local governments in the Gunnison Valley has expressed interest and set goals around reducing emissions. Coordinated policy making among all of the local governments is necessary to reach the goals we need to achieve especially around the transit/ housing nexus and tourism related traffic and parking impacts. Building codes that are consistent and similar across the county will make adaptation by builders easier. As development continues to push out of the towns land use planning and coordination between municipalities and the County is and will continue to be necessary to minimize sprawl and meet growth demands.

Rather than sustainability being another program or plan, what is needed is organizational culture change that considers sustainability, energy use, and emissions in all decisions and plans. These issues should be a fundamental filter for decision making just as cost and community preference are.

9. Conclusion

9.1. Forecasted greenhouse gas reduction of combined recommendations

When the greenhouse gas savings from all recommendations for each sector discussed are applied together the result is a forecasted emissions reduction of greater than 50% from 2015 levels by 2030.



These results are in alignment with the IPCC recommendations to stay within a 1.5-degree Celsius global warming scenario. This modeled path is possible but will take enormous effort by local and state government, business, and the citizens of the Gunnison Valley. The co-benefits of the actions needed to achieve this goal are: cleaner air, a vibrant economy, better housing, less traffic, and lower energy costs.

Final Thoughts

Citizens and leaders in the Gunnison Valley have been aware of the threat of climate change for a long time. Several efforts to measure the valley's carbon footprint and reduce it have been undertaken and progress has been made, but results are lagging goals. In 2016 Gunnison County commissioned a new carbon footprint baseline report that was completed by Dr. Abel Chavez and the Community Solutions Incubation + Innovation (CS2I) Lab and Western Colorado University based on 2015 GHG emissions levels. The report revealed little change in overall emissions from the prior report that was based on 2005 levels, however direct comparisons are difficult because methodologies have changed.

The 2015 GHG emissions baseline highlighted the need for additional action. Subsequently the Town of Crested Butte commissioned a GHG baseline report and developed a Climate Action Plan with aggressive goals to reduce emissions both in the Town's operations and community-wide. The City of Gunnison also incorporated climate goals into its 2019 Master Plan. With momentum developing and community demands for climate action becoming stronger the One Valley Leadership team along with community members and volunteers at the Gunnison Valley Climate Conference in January 2020 provided a broad outline and a path toward large reductions in greenhouse gas emissions. The conference attendees and stakeholders were able to model reductions of 50% which align with IPCC targets to contain climate change to 1.5 degrees Celsius. This is an important and encouraging outcome. The 50% reduction in emissions was not set as a aspirational goal but rather was derived from the hard work of analyzing each sector contributing to the valley's overall emissions and discussing practical application of strategies and modeling their likely impact on emissions. Change of this magnitude will likewise not be affected through proclamation, but will instead require policy, regulation, and reinforcement of the goal in organizational decision making to reduce emissions at nearly every level of local government. Climate change mitigation must become incorporated into the culture of intuitions and our community to be successful. The effort put forth by this generation will result in outcomes enjoyed by the next, we have a moral obligation to ensure success.